Analysis of SOX2-Expressing Cell Populations Derived from Human Pluripotent Stem Cells.

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Public Summary:
Marker cell lines provide a powerful approach to study the process of differentiation of human pluripotent stem cells into mature cell populations. In this study, we use a SOX2-GFP marker line to study the differentiation of hPSCs into neurla cell types and lung progenitors. This method allowed to us to identify a unique signature present on lung progenitors which can be used to identify and isolate these cells. Future studies will focus on isolation and transplantation of these lung progenitors.

Scientific Abstract:
SOX2 is involved in several cell and developmental processes, including maintenance of embryonic stem cells, differentiation of neural progenitor cells, and patterning of gut endoderm. To study its role in a human system, we generated a human embryonic stem cell (hESC) line harboring a reporter gene encoding GFP in the SOX2 locus. This SOX2 reporter line faithfully recapitulates expression of the SOX2 gene in undifferentiated human pluripotent stem cells (hPSCs), neural progenitor cells (NPCs), and anterior foregut endoderm (AFE). In undifferentiated hESCs, GFP expression corresponds to those cells with highest levels of expression of genes associated with the pluripotent state. In NPCs, expression of GFP can be employed to isolate cells expressing markers associated with NPC multipotency. In AFE, we used transcriptome-wide expression analysis to identify cell surface markers with elevated expression in this population, thereby facilitating isolation and purification of this hPSC-derived cell population.